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ASSASSINATION OF PRESIDENT KENNEDY*

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DESPITE extensive world press coverage and numerous books on the assassination of President John F. Kennedy, scant attention has been given to the medical and scientific aspects of the murder. This brief account is limited to only a few, ignored, facets of the crime.

THE ASSASSINATION

As the motorcade passed through Dealey Plaza, Dallas, Texas (fig. 1), at 12.30 hours Central Standard time [18.30 hours London time] on November 22, 1963, the lead car, containing the President and his wife, and John Connally, Governor of Texas, and his wife, was being photographed at 18.3 frames per second by Abraham Zapruder with a hand-held 8-mm. movie camera. (This film was purchased by *Life* and copyrighted. The Warren Commission copy is now in the Archives but is not available to the public. It may—but only after heroic efforts—be studied by 'serious scholars'. Some key frames, including those mentioned here, were published by *Life* in 1966).

Governor Connally was seated directly in front of the President when, allegedly, three shots were fired by Lee Harvey Oswald, located above, behind, and to the right in a sixth-floor window of the Texas School Book Depository Building. The President was looking slightly to the right, with his right hand raised in a gesture to the crowd, when he was temporarily obscured from Zapruder's camera at frame 218. When he reappeared at frame 224 the President showed pain and was reaching for his throat. (Olson and Turner, 1971, have adducted evidence that the first shot was fired much earlier). Thus the first shot at a depressed angle of $20^{\circ} 23'$ and a distance of 188 feet (57.3 m.) is alleged to have entered from the rear, traversed his neck without striking bone, and emerged from the front in the midline between tracheal rings three and four. By the conclusions of the Warren Commission, the bullet continued without deflection, fractured Connally's fifth rib lateral to the scapula, emerged beneath his right nipple, and fractured his distal right radius to become entangled in his clothing, only later to fall out at Parkland Hospital. The second shot (three empty cartridge cases were found) is presumed to have missed. The third and fatal shot came 5.6 seconds later at frame 313 when the right side of the President's head exploded. (After publication of the Warren Report it was noted that, by superimposing frame 314 on frame 313, the President's head,

* The work reported herein was done at the personal expense of the author and the opinions expressed do not reflect the approval of any other person or organization.

neck and shoulders jerked backwards within this 0.054 second. The author, confirming this observation, testified that this backward movement, also grossly apparent on viewing the movie, is *compatible* with a gunshot from the front.)

Upon arrival at Parkland Hospital, five minutes later, the bullet hole in the front of the neck, then considered to be a hole of entry, was obscured by a tracheostomy incision. The body was not turned over and the bullet hole in the back of the neck escaped notice. It must be remembered that the

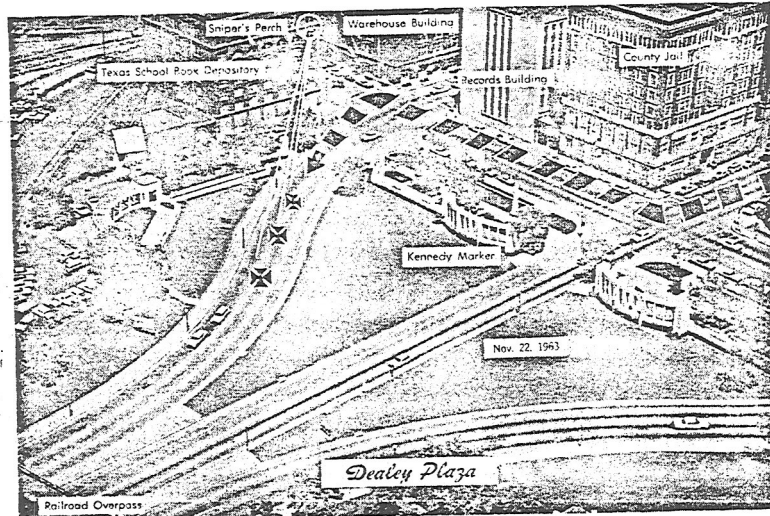


FIG. 1.—Postcard view of Dealey Plaza showing route of the motorcade, alleged position of Oswald and presumed trajectory of three shots.

assassin had not violated any federal law and therefore had not committed a crime against the people of America; he had violated Texas State law and committed a common law crime against the people of Texas. Therefore, all subsequent proceedings would have to be pursuant to Texas law, except any assistance requested by Texas authorities from federal agencies such as the Federal Bureau of Investigation (FBI). The first breach came when the body was forcefully removed by a small group of Secret Service and FBI agents despite the violent physical protests of the coroner of Dallas County, Earl Rose, now Professor of Pathology in the University of Iowa. The body was thus illegally removed 1,375 miles from the State of Texas without the necessary burial-removal permit which is issued only after release by the coroner and after the death certificate has been filed. These requirements are common to all states.

THE NECROPSY

After arrival at the Naval Hospital in Bethesda, Maryland, the necropsy was conducted primarily by two naval pathologists in a crowded room with

a rapidly changing array of admirals, generals, colonels, naval captains, Secret Service and FBI agents, and others, only a few of whom were medically qualified. X-ray films of the head revealed multiple bullet fragments. Before completion of the necropsy Lieutenant-Colonel Pierre A. Finck, a student of missile wounds, arrived in the capacity of an army 'observer' in this naval enclave. His status was such that, in order to examine

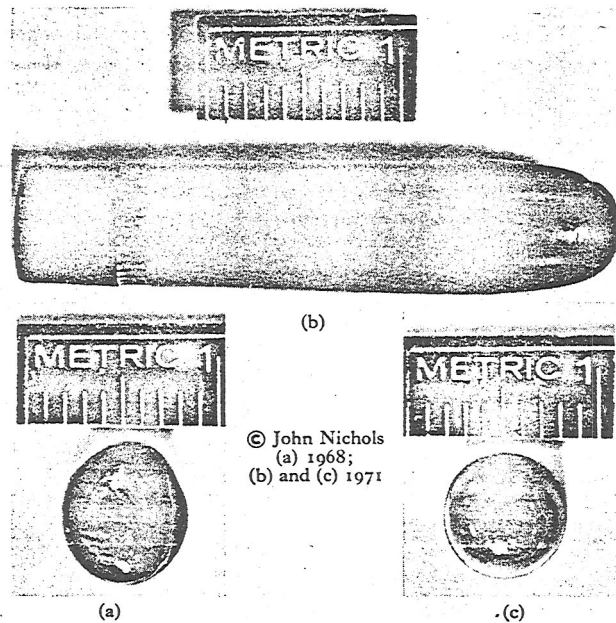


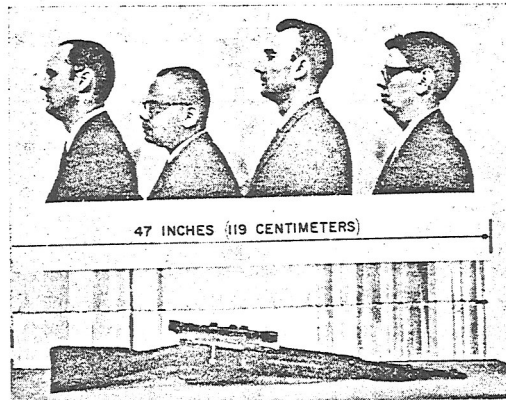
FIG. 2.—(a) The base, (b) the body, and (c) the nose of the bullet (CE 399).

for back wounds, it was necessary for him to obtain permission from an unidentified major-general, a public relations officer. Colonel Finck, however, did have total body x-ray films exposed as well as gross photographs, both black and white and colour. The x-ray films were developed and read by a radiologist but, together with the gross photographs, were not seen by the pathologists during the necropsy or preparation of the protocol.

The history of these x-ray films and photographs is nebulous. In April 1965 they were deposited with the Archivist of the United States with, later, a stipulation that they may be studied only by scholars approved by the executor of the Kennedy estate. I have repeatedly been denied permission to study them, but John K. Lattimer, Professor of Urology in Columbia University, has and concluded that the Warren Commission made no errors (Lattimer, 1972). However, Cyril Wecht, Professor of Medical Jurisprudence and Past President of The American Academy of Forensic Sciences, and E. F. Chapman, Coroner of Wayne County, Michigan, have (separately) studied them, and both decided that there were major discrepancies in the conclusions of the Warren Commission (Wecht, 1972; Chapman, 1973).

THE WARREN COMMISSION

On November 29, 1963, seven days after the assassination, and five days after the murder of the alleged assassin, the new President, Lyndon Johnson, created the 'President's Commission on the Assassination of President Kennedy', popularly known as the Warren Commission from its chairman, Earl Warren, Chief Justice of the United States. The main conclusion of the Warren Commission was that Oswald acted alone and fired, within 5.6 seconds, three shots, the first bullet passing through Kennedy's neck



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FIG. 3.—A bullet from authentic ammunition will penetrate 47 inches of laminated pine before its energy is spent (see text). The first person shown on the left of this illustration has the same measurements and weight as President Kennedy: height 6 feet 1 inch; weight 181 pounds (83 kg.); neck circumference 15½ inches.

without hitting bone and, without deflection, inflicting Connally's wounds, only later to fall from his clothing at Parkland Hospital. This bullet was designated commission exhibit (CE) 399.

EXPERT PANEL

The ensuing furore and criticism of the Warren Commission Report by the public prompted Attorney General Ramsey Clark to convene, in February 1968, an expert panel of three eminent forensic pathologists and a radiologist to review the gross photographs and x-ray films taken at necropsy but not seen by the pathologists before submission of the necropsy protocol. This expert panel reported several important new findings, only three of which will be considered:

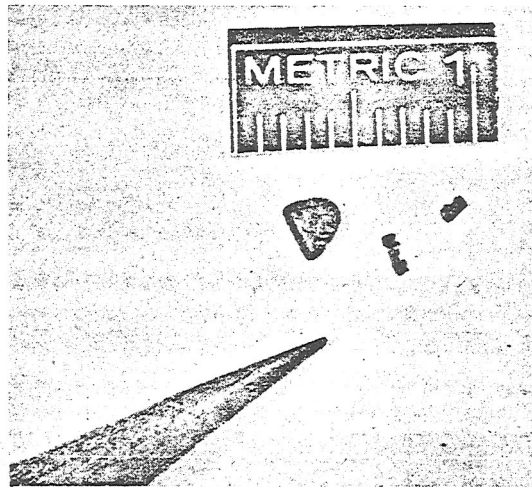
- (1) A bullet hole of entry in the skull 100 mm. above the external occipital protuberance, whereas the pathologists reported a bullet hole *slightly* above and 2.5 cm. to the right of the external occipital protuberance.
- (2) A grey-brown unidentified rectangular object measuring 14 × 20 mm. lying in the base of the brain, not previously noticed.

(3) A delicate tract of metal particles in the soft tissues of the neck region not seen by the radiologist who examined the x-ray films during the necropsy.

CE 399 is a military bullet, fully jacketed, with a 0.64-mm.-thick alloy of 93 per cent. copper and 7 per cent. zinc. Such jacketed bullets usually do not leave particles of metal in soft tissue when bone is not struck (in fact naked lead bullets usually do not leave metal particles in soft tissue when bone is not struck).

PUBLIC DISQUIET

Much of the public disquiet has centred on the fact that, according to his Marine Corps records, Oswald was only a mediocre rifleman, and on the



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FIG. 4.—Three fragments (CE 842) of metal removed from Governor Connally's wrist (see text).

fact that the alleged weapon is a very poor specimen of a war-surplus bolt-action Italian army rifle. It has an inferior 4-power Japanese telescopic sight with an extremely narrow field. Most skilled persons cannot fire three aimed shots from similar weapons within 5.6 seconds. Expert marine corps riflemen, however, were able to fire the required three shots within the allotted 5.6 seconds, but at ground level at a stationary target and not from a height of sixty feet (18.28 m.) at a moving target. My investigations, and attempted investigations, have included the following studies.

- (1) Identical ammunition fired in an identical weapon through ribs and wrists and other appropriate anatomical specimens and recovered from mattresses.
- (2) The kinetic energy and penetrating power of CE 399.
- (3) The lateral angle of Oswald's line of fire which has never previously been measured or calculated.
- (4) Trace metal content of the margins of bullet holes in the President's coat, CE 399, and fragments CE 842, surgically removed from Connally's wrist.

- (5) The newly found 14×20 mm. object in the base of the brain.
 (6) The head wound, by examination of the necropsy photographs and x-ray films.

BALLISTICS

Figure 2 shows the base, body, and nose of CE 399. Ballistic examination established that this bullet was fired from Oswald's weapon. The person who found the bullet, on a stretcher on which Connally was presumed to have been transported, omitted to mark the bullet, which subsequently passed through the custody of at least two additional hospital employees

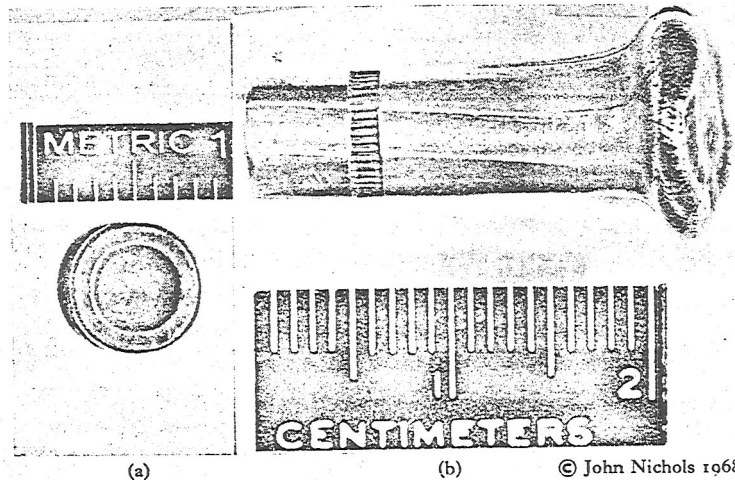


FIG. 5.—Bullet from authentic ammunition shot through a rib and wrist from a recently amputated arm and collected in mattresses showing (a) that the base remains pristine while (b) the nose becomes grossly mutilated.

and two FBI agents before reaching the ballistics laboratory. Receipts were not given and records were not made. This is the only piece of evidence connecting Oswald with the crime, and today the person who found CE 399 refuses to identify it. (Learned counsel opine that CE 399 is not admissible as evidence in an American [Texas] Court.)

The mutilated nature of the base of CE 399 (fig. 2a) is shown here for the first time. This bullet could not have been fired in any gun in this condition. The base of CE 399 therefore became mutilated after firing; I have placed my entire weight (200 pounds [90.7 kg.]) on the base of such pristine bullets without producing deformity. It can also be seen that metal has been shaved from the nose for spectrographic analysis (the results of which the FBI refuse to divulge).

The mutilation of the lead core at the base must account for the loss of 2.5 grains (162 mg.). CE 399 weighs 158.6 grains (10,277 mg.) whereas all bullets removed from identical ammunition by the author before firing weighed 161 grains ± 0.07 grain (standard error of the mean).

After re-seating and firing directly into mattresses the bullets lose about

$\frac{1}{4}$ grain (16 mg.) due to friction in the gun barrel and in the mattresses. Apart from this, such bullets are always recovered pristine.

Figure 3 shows that such bullets, with a speed of 1,960 feet per second and 1,373 foot-pounds* of energy, will penetrate 47 inches of laminated pine (*Pinus ponderosa*) before the energy is spent. This, of course, is equivalent to several necks, several ribs, and several wrists. Yet CE 399 is presumed to have become entangled in Connally's clothing. The upholstered partition between the passenger and driver compartments, next in line of fire, was not even scratched.

Figure 4 shows three fragments (CE 842) of metal surgically removed from Connally's wrist. An unfired bullet identical with CE 399 weighs 161.07 grains (see p. 630):

CE 399 weighs	158.6 grains
Large fragment of CE 842 from Connally's wrist weighs	0.5 grain
Two small unweighed fragments of CE 842 from Connally's wrist generously estimated to weigh	0.1 grain
Loss of weight of CE 399 from friction in gun barrel generously estimated to be	0.3 grain
Metal reasonably accounted for	159.5 grains

Therefore the metal unaccounted for is approximately 1.5 grains. If CE 399 inflicted both the neck wound of the late President and Connally's wrist wound the trace metal composition must, perforce, be identical in both exhibits.

Even highly refined metal contains contaminants characteristic of a particular lot. Lead especially contains traces of arsenic, antimony, and bismuth in quantities too small for detection by destructive chemical analysis and destructive spectrographic analysis. Fortunately harmless neutron activation is the most sensitive and most reliable method known for detection of these trace metal contaminants. The specimen returns entirely to its normal condition shortly after removal from the nuclear reactor. Such results have been admitted in several trial courts of the world.

If the trace metal content and ratios of CE 399 are different from those of CE 842 then a fourth shot must have been fired and another person must have participated in the murder because all agree that it is impossible for any person to fire four shots from Oswald's gun in the allotted 5.6 seconds.

Figure 5 shows a bullet which I shot through a rib and a radius of a recently amputated arm and collected in mattresses. The nose of the bullet is grossly deformed and the base remains pristine. Similar results were obtained in all such bullets fired through ribs and wrists.

ANGLE OF FIRE

Figure 6 is the view through Oswald's telescopic sight at Frame 222, showing the depressed angle of $20^{\circ} 23'$ prevailing at the first shot as meas-

$$\text{*Foot pounds of kinetic energy} = \frac{(\text{velocity})^2 \times \text{weight in grains}}{(32.16) \times 2 \times 7000} = 1,373$$

(When velocity is 1,960 feet per second and the weight is 161 grains)

ured in the FBI re-enactment. I have both measured and calculated the lateral angle at this frame to be $9^{\circ} 21'$. Elementary anatomy indicated that the minimum lateral angle for the bullet to miss the transverse processes and emerge in the midline is 28° ; this is obviously impossible from Oswald's

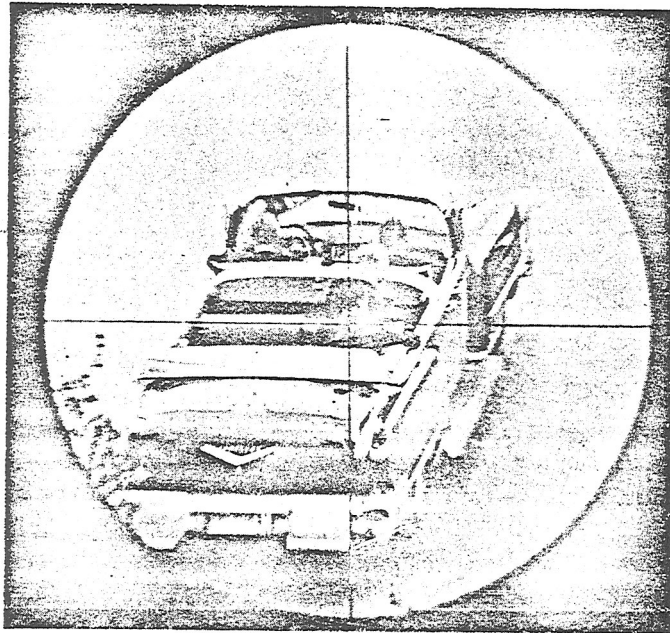
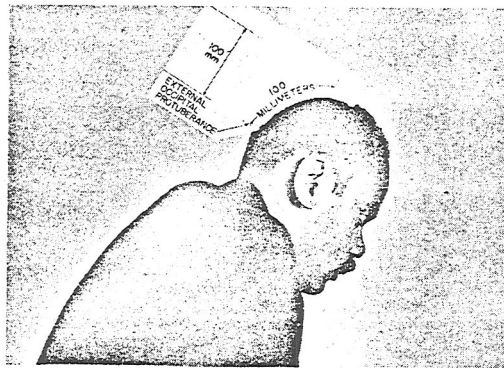


FIG. 6.—View through Oswald's telescopic sight at Frame 222 of film (see text). (CE 895, photograph by courtesy of C. M. Kelley, Director FBI).



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FIG. 7.—Showing required location of a bullet wound in the skull 100 mm. above the external occipital protuberance (see text).

alleged firing position. If the bullet had continued without deflection Connally would have been shot in the left chest rather than the right chest and the bullet would have emerged below the diaphragm.

Figure 7 shows the required location of a bullet wound in the skull 100 mm. above the external occipital protuberance. The expert review panel did not mention if this was measured on the convex surface of the skull or vertically.

CONCLUSION

I have been engaged in efforts to study artifacts of the assassination since January 1964 and in litigation since 1969 for permission to submit the President's coat, CE 399, and CE 842 to harmless neutron activation analysis in the nuclear reactor of the University of Kansas, and to examine the x-ray films and photographs taken at necropsy. The trial judge, on a motion by the defendants to dismiss or for summary judgment, observed, among other things, that there were 'no facts in controversy' and granted summary judgment. The appeal court upheld the trial court and the Supreme Court denied *certiorari* without comment.

I believe there is reasonable doubt that the President's neck wound was inflicted from Oswald's alleged firing position (as displayed in frames 218 to 224), and reasonable doubt that bullet CE 399 inflicted Connally's wrist injury. If harmless neutron activation analysis should reveal the trace metal content and ratios of the margin of the bullet hole in the coat, CE 399, and CE 842 to be identical the conclusions of the Warren Commission would be supported. If, however, the trace metal content and ratios are different then Oswald could not have acted alone.

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